

# **List of U.S. Army Research Institute Research and Technical Publications**

**October 1, 2002 to September 30, 2003  
With Author and Subject Index**

**U.S. Army Research Institute for the Behavioral and Social Sciences  
5001 Eisenhower Avenue, Alexandria, Virginia 22304-4841**

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## **Foreword**

The means of dissemination of the results of the U.S. Army Research Institute for the Behavioral and Social Sciences' (ARI) research and development/studies and analysis program vary widely depending on the type of work, the subject matter, and the sponsor/proponent. Typically, major findings with immediate policy and procedural implications are briefed to sponsors and proponents in order to enable timely implementation. This is followed up with complete documentation in the form of research and technical publications such as the ones listed here. In many cases, these documents represent the actual item handed off to the sponsor/proponent; this is particularly true of the Research Product category. In other cases, results are published in order to provide a complete record of the work done, and for future reference by researchers doing work in the same or similar areas.

This annotated list for FY2003 provides an idea of both the depth and scope of the ARI research effort, and is a valuable resource for anyone interested in military psychology from either a scientific or operational perspective.

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# **List of U.S. Army Research Institute Research and Technical Publications**

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## Introduction

The primary responsibility of the U.S. Army Research Institute for the Behavioral and Social Sciences (ARI) is to maximize Soldier effectiveness. ARI accomplishes its mission through research and development in the acquisition, training, utilization, and retention of Army personnel. ARI research and products affect every Army mission with a human performance component.

As convenient references for qualified agencies and individuals and sponsors, ARI publishes lists of its technical and research publications. This issue of the publication list describes reports published during the period October 1, 2002, to September 30, 2003. It contains the abstract of each publication and the bibliographic information needed to identify a publication. The abstracts have been written, as far as possible, to describe the principal research findings in non-technical terms; however, technical language is used to communicate efficiently the details of research analysis. Author and subject indexing provide access to individual reports and topics.

### ARI Publications

ARI publications are divided into

separate, consecutively numbered categories appropriate to their intended audience and function. During fiscal year 2003, the following types of research and technical reports were issued by ARI:

**Research Note (RN).** An interim or final report typically of limited interest outside of ARI. It is filed with the Defense Technical Information Center (DTIC) but is not printed. Research Notes usually fall into one of the following categories:

- An in-house report that is of limited interest outside of ARI but is considered worth submitting to DTIC to be part of the Department of Defense (DoD) archive of technical documentation.
- An interim contract report that is of limited interest outside of ARI but is considered worth submitting to DTIC to be part of the DoD archive of technical documentation.
- A final contract report that is of limited interest outside of ARI but must be submitted to DTIC in

accordance with Department of the Army regulations to close a contract.

- Material related to a Research Report or Technical Report (detailed tables, graphs, charts, sample forms, and sample training and testing materials) published as a Research Note to economize on printing and distribution.

**Research Product (RP).** A user-oriented report intended to aid Army personnel. Examples are handbooks, manuals, and guidebooks.

**Research Report (RR).** A report of completed research intended primarily for dissemination to military managers. Research Reports may deal with policy-related issues but typically do not include specific policy recommendations.

**Special Report (S).** A published report on a topic of special interest or in-house research intended primarily for dissemination to a select audience.

**Study Report (SR).** A published report briefly documenting studies and analyses.

**Study Note (SN).** A Study Note may contain or consist of technical text, computer code, diskettes or tapes with software, databases, codebooks or other documentation, raw data, data collection instruments, figures, tables, or any other products that do not concisely convey the import of a project but which must be archived for technical completeness.

**Technical Report (TR).** A report of completed research intended primarily for dissemination to researchers.

Research Reports and Technical Reports published by the U.S. Army Research Institute for the Behavioral and Social Sciences are intended for sponsors of research and development (R&D) tasks and for other research and military agencies. Any findings ready for implementation at the time of publication are presented in the last part of the Executive Summary. Upon completion of a major phase of the task, formal recommendations for official action normally are conveyed to appropriate military agencies by briefing or memorandum.

### **ARI Distribution**

Initial distribution of these publications was made directly by ARI. Research Reports, Technical Reports, Study Reports, and Research Products were distributed primarily to operational and research facilities and their sponsors in DoD, to other interested Government agencies, and to DTIC; copies of some reports were also sent to the Library of Congress for distribution to libraries participating in the Documents Expediting Project. Research Notes and Study Notes were deposited with DTIC but were not published.

These publications are NOT available from ARI. DoD agencies and contractors can purchase paper copies or microfiche from:

Defense Logistics Agency  
Defense Technical Information Center  
8725 John J. Kingman Road, Suite 0944  
Ft. Belvoir, VA 22060-6218  
(703) 767-9030 or DSN 284-9030

Other Government agencies and the general public can obtain unclassified reports from:

U.S. Department of Commerce  
National Technical Information Service  
5285 Port Royal Road  
Springfield, VA 22161  
(703) 487-4650

**NOTE:** When requesting copies of these reports, use the DTIC accession number (AD -----) appearing in parentheses following the date of publication of each citation.



## **Technical Reports**

### **TR 1132**

#### **Improving Soldier Factors In Prediction Models**

Archer, R., Walters, B., Oster, A., & Van Voast, A. (AD A408867)

This report was developed under SBIR contract for topic A98-163. A key decision made at the highest levels of any military is the trade-off between allocating resources to system acquisition versus allocating resources to maintain force readiness through training. Advanced Distributed Simulations (ADS) provide a mechanism for tactical combat training through man-in-the-loop simulators and Computer Generated Forces (CGF). The potential for using ADS to address the trade-offs for allocating resources is dampened by the unrealistic behavior of CGF. Phase I of this project produced algorithms, data structures, and a methodology for incorporating the effects of training and environmental stressors to improve CGF behavioral realism. In Phase II, we expanded and enhanced the technical feasibility for including these effects in CGF entities on simulated battlefields. The resulting product is called the Training Effects and STressor Integration Module (TESTIM). It can provide the Army with the ability to improve the realism of CGF entities in ADS and other human performance models. TESTIM can also be used to assess the expected payoff of training in terms of improved performance.

### **TR 1133**

#### **Web-Based Collaborative Learning: An Assessment Of A Question-Generation Approach**

Belanich, J., Wisher, R.A., & Orvis, K.L. (AD A410956)

Students linked into a learning environment over the Internet may learn topics better by collaborating to create questions and answers. In research reported here, students used a learning aid for collaborative question generation called Army TEAMThink, a commercial program modified for Army use under a TRADOC Delivery Order contract. Research was done at three US Army schools to assess the quality or doctrinal correctness of questions and answers generated by students and to measure any learning benefit. Students first completed a tutorial on how to write effective multiple-choice questions. Next, students wrote questions and reviewed questions written by other students. Based on the feedback from the reviews, authors were allowed to modify their own questions. Finally, students took a test of the questions that had been developed by students using the learning aid. Army subject matter experts judged that most of the questions developed were considered acceptable and could be repurposed for use in course exams. A majority of the question feedback was constructive, indicating that the collaborative process was helpful. Students who went through the process scored higher on a test of novel questions than those who did not use Army TEAMThink. They also scored higher than students who went through the process on a different topic from the test topic, demonstrating a moderate learning effect. The general finding of this research about a collaborative question-generation approach is that instructors can accumulate quality multiple-choice questions and monitor student comprehension, and students have an additional opportunity for better learning.

## **Technical Reports**

### **TR 1134**

#### **Cooperative Interface Agents for Networked Command, Control, and Communications (CIANC<sup>3</sup>): Phase I Final Report**

Wood, S.D. (AD A414232)

This report was developed under a Small Business Innovation Research Program 2000.2 contract for topic A02-024. The research reported here explored methods for effectively controlling FCS units containing mixed human and robotic elements. The objective was to determine whether an agent framework built around three specified agent types (Tasking, Coordinating, and Monitoring) could be constructed to add an intelligent abstraction layer between human commanders and battlefield elements. The focus was to identify human-system interaction issues, design potential solutions, and create software that supports the commander's tasks and mitigates inherent human performance limitations. A prototype interface agent architecture was designed, and a framework was implemented. Interface agents were created to perform in a simple, simulated battle scenario. The work conducted during Phase I lays the foundation for a Phase II plan to create more realistic scenarios and test the utility of interface agents in a variety of experimental settings.

### **TR 1135**

#### **Utility Of Game Instructions**

Chen, J.Y.C. (AD A414105)

Due to the increasing usage of computer games for military training purposes, it is more important than ever to understand how computer games can be utilized in an effective and efficient manner. One important issue facing the military training community is that training time is at a premium and trainees need to be able to play the game within as short a time as possible so they can start using the game to train the skills of interest. This report describes an experiment that examined various game-related performance measures and concluded that the two different instructional techniques (i.e., computer-based tutorials and game tips) appeared to be effective in different ways, and players with access to both learned the game most effectively. To be more specific, computer-based tutorials appeared to be more beneficial for motor elements such as maneuvering and actions. On the other hand, those who had access to game tips performed better in cognitive segments of the game such as setting up game plans and familiarity with the game interface. These results can be incorporated in military training programs where computer games are part of the curriculum. Future military game development can also utilize these results to determine which type of instructional material to be included in the games.

### **TR 1136**

#### **Distant Leadership Under Stress**

Xiao, Y., Seagull, F.J., Mackenzie, C.F., Klein K., Ziegert, J., & Scalea , T. (AD A417104)

This project was initiated to develop a phenomenology of team leadership and distant leadership in a highly dynamic, potentially extremely stressful domain: trauma patient resuscitation. A series of five studies were conducted to understand team leadership in trauma teams. One of the studies was a field experiment in which the location of the team leader was assigned to a distant location connected to the rest of the team through telecommunication linkages. The studies used

## **Technical Reports**

a variety of qualitative and quantitative methods. In contrast to previous frameworks of leadership, the current project depicted detailed team leadership processes and structures critical to the success of action teams. These processes include adaptation of team structures in response to task urgency, team experience, and distance; the fluidity of leadership functions performed by various members of a team; and a multitude of leadership functions. The contribution of the project should be mainly in its depiction of the complex and fluid nature of team leadership for teams that are multi-disciplinary, highly learning oriented, and the hypothetical impacts of distance. The project laid out a new foundation for future research of team leadership in collocated as well as distributed teams.

### **TR 1137**

#### **Lessons Learned On Collective Efficacy In Multinational Teams**

Karrasch , A.I. (AD A414109)

This report documents a focused look at the dynamically integrated beliefs a team develops concerning their capabilities (collective efficacy) in multinational teams. The results of this research indicated that the level of collective efficacy for the Stabilization Force in Bosnia-Herzegovina appears relatively strong, as would be expected, given their history of success. Efficacy at the organizational level was not as strong and not as homogenous as compared to primary team level, indicating that primary teams have more of a shared sense of capability. A discussion of the situational and individual level variables expected to impact the formation of efficacy is included. Finally, this report highlights some lessons learned about conducting research with multinational teams.

### **TR 1138**

#### **Virtual Environments For Dismounted Soldier Simulation, Training, And Mission**

#### **Rehearsal: Results Of The FY 2002 Culminating Event**

Knerr, B.W., Lampton,D.R., Thomas, M., Comer, B.D., Grosse, J.R., Centric, J.H., Blankenbeckler, P., Dlubac, M., Wampler, R.L., Siddon , D., Garfield, K.A., Martin, G.A., & Washburn , D.A. (AD A417360)

This report describes the activities and results of the final year culminating event (CE) of the "Virtual Environments for Dismounted Soldier Simulation, Training and Mission Rehearsal" Science and Technology Objective (STO). This STO was conducted jointly by the U.S. Army Research Institute, the U.S. Army Simulation, Training, and Instrumentation Command (STRICOM), and the U.S. Army Research Laboratory. This four-year effort (FY99-FY02) was focused on overcoming critical technological challenges that prevented high fidelity dismounted Soldier simulation. The objectives of the CE were to integrate and evaluate the technologies developed during the year. The key technologies included: a Dismounted Infantry Virtual After Action Review (AAR) System; new behaviors and improved operator control for Dismounted Infantry Semi-Automated Forces (DISAF); Soldier control of DISAF through Voice Recognition and Synthesis; enhancements to the Soldier simulator, the Soldier Visualization Station (SVS); and a dynamic terrain server. The CE provided a realistic and challenging test of the systems and capabilities under development. The results include lessons learned, feedback from Soldiers obtained by questionnaires and group interviews, and observer rating of leader and squad performance. Technological developments over the course of the STO greatly increased the variety and realism of the training situations that could be presented and leader ratings of training

## **Technical Reports**

effectiveness. Both leader self-ratings and performance scores indicate that Soldier skills improved with practice in VE.

## **Research Reports**

### **RR 1796 Canceled**

#### **RR 1797**

#### **Enhancing Officer Candidate School (OCS) Enrollment In The Army National Guard (ARNG)**

Smith, M.D. & Hagman, J.D. (AD A408871)

This research examined why ARNG state OCS attendance is dropping, and what can be done about it. Standard Installation/Division Personnel System (SIDPERS) records were used to determine how many pay grade E4-E8 Soldiers (i.e., Specialist/Corporal through First/Master Sergeant) currently meet OCS enrollment eligibility requirements. Results indicated that of the four (out of a total of eight) objective eligibility requirements documented in SIDPERS, the age limit of 30 has the greatest negative impact. Almost 60% of the Soldiers in the total sample, and more than 90% of those in pay grades E6-E8, are simply too old to apply. To determine the impact of eligibility requirements not documented in SIDPERS, a nationwide survey of E4-E8 ARNG Soldiers was conducted. Results from the completed surveys of 500 respondents revealed that only 5.5% meet all eight objective OCS eligibility requirements. Based on both survey responses, and SIDPERS data, ten recommendations are proposed for enhancing ARNG state OCS enrollment through the use of more targeted recruitment, better incentives, and revised eligibility criteria.

#### **RR 1798**

#### **Vertical Teams In The Objective Force: Insights For Training And Leader Development**

Cox, J.A., Holder, L. D., Leibrecht, B.C., & DeRoche, L. (AD A408924)

This report addresses the selection and training challenges expected for vertical teams—commanders and staff leaders of multiple echelons—in the Army's planned Objective Force. Researchers interviewed experienced warfighters and trainers operating in the Interim Brigade Combat Team (IBCT) environment. They also observed collective training events conducted by the Army's first IBCT, and reviewed Army documents relating directly to the Objective Force and Future Combat Systems. The findings document the selection considerations (knowledge, skills, and aptitudes), training issues (problems and challenges), and training methods expected to shape vertical teams in the future force. Recommendations are offered for steps to expand the database related to training, leadership, and Soldier factors. The results forge a foundation for creating and sustaining high-performing teams that can fight and win on the battlefields of the future.

#### **RR 1799**

#### **The Computer Backgrounds Of Soldiers In Army Units: FY01**

Singh, H. & Dyer, J.L. (AD A409024)

A multi-year research effort was instituted in FY99 to examine Soldiers' experiences with computers, self- perceptions of their computer skill, and their ability to identify frequently used, Windows-based icons. This report documents the results of the second and last year of surveys from Soldiers in Forces Command units. The Soldiers surveyed were from mechanized and non-mechanized Infantry companies, the battalion staff, and battalion slice elements (Medics,

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Combat Engineers, and Field Artillery). The officers and senior non-commissioned officers had the most computer expertise as measured by their icon scores. For junior non-commissioned officers, specialists, and privates, the picture was more diverse. Almost half of these Soldiers had limited computer skills, as measured by both subjective and objective indices. Frequency of using a variety of computer features on a regular basis related highly to computer expertise. When specialists and corporals were examined separately, opportunity to use computers as part of their duty position was also related to computer expertise. The results indicate that young Soldiers with limited computer skills would benefit from basic computer training prior to learning specialized training on the Army's new digital systems.

### **RR 1800**

#### **Preliminary User Feedback Of A Prototype Bradley Fighting Vehicle M2A3/M3A3 Embedded Training System (BETS)**

Salter, M.S., & Rich, K.B. (AD A408855)

This report documents three user evaluations of the prototype Bradley Embedded Training System (BETS) device. The BETS is an embedded gunnery trainer for the A3 version of the Bradley Fighting Vehicle (BFV). The BETS uses BFV vehicle controls and optics, and the same training device software as the already fielded gunnery trainer BATS, the Bradley Advanced Training System. Bradley personnel from Fort Benning and Fort Hood fired two gunnery exercises using the prototype BETS device and provided comments about the device and its potential capabilities. Users almost universally expressed very high positive opinions about the BETS prototype and its potential.

### **RR 1801**

#### **Integrated Training And Performance Support For The Objective Force**

Throne, M.H., & Burnside, B.L. (AD A410554)

The U.S. Army has begun transformation to an Objective Force operating within joint, interagency, and multinational environments. This transformation will require changes in training, with more of a reliance on embedded training and electronic performance support system (EPSS) capabilities, in order for units to be responsive, deployable, agile, versatile, lethal, survivable, and sustainable. This report reviews Objective Force training needs and applies an existing method for analyzing the appropriateness of alternative methods for meeting these needs. This initial analysis indicates that for the overall systems level, fully or appended embedded training is recommended. At the task level, embedded training is appropriate to varying degrees, depending on a number of considerations. Information on the performance of all tasks should be embedded, but practice of task performance with feedback should only be embedded where safe, reasonable, and cost-effective. This report also includes a brief summary of the embedded training and EPSS literature, leading to derivation of a set of usage considerations and design guidelines for developing effective embedded training and EPSS capabilities.

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### **RR 1802**

#### **The Effectiveness Of Web-Based Instruction**

Wisher, R.A., & Olson, T.M. (AD A413462)

As the Army focuses more on Web-based instruction as a delivery option for training, professional development, and education, it is important to understand its instructional effectiveness. A search of the literature between 1996 and 2002 identified more than 500 reports concerning Web-based courses, that is courses delivered over the Internet or an intranet and conveyed through a browser. Most concerned recommendations for design or technology issues rather than empirical measures of learning outcomes. From this larger set, 47 studies reported empirical measures of outcomes; of these, 15 studies reported data with sufficient detail to compute an effect size. The effect size, comparing Web-based instruction to conventional classroom instruction, was .24, which means the "average" student moved from the 50<sup>th</sup> to the 59<sup>th</sup> percentile. In earlier analyses of the effectiveness of other forms of computer-based instruction, effects sizes of between .32 and .41 have been reported (corresponding to the 63<sup>rd</sup> and 66<sup>th</sup> percentiles). In terms of instructional effectiveness, it appears that current practices in Web-based instruction improve learning when compared to the classroom, but many more complete studies are needed before the full effect size is understood.

### **RR 1803**

#### **Development And Evaluation Of Communication-Based Measures Of Situation Awareness**

Evans, K.L., & Christ, R.E. (AD A413106)

The present investigation sought to develop and field test two new behavioral measures of situation awareness (SA) that rated the content of small unit radio transmissions. Initially, a four-person team generated an item pool of 318 critical incidents of communication behavior, each intended to represent either an outstanding, typical, or poor level of SA on the part of small unit leaders. A group of 24 independent evaluators then rated the degree to which they thought each of the 318 items was related to the concept of SA. The 20 items having the highest levels of agreement among the independent evaluators within each SA level were chosen to comprise the Radio Communications Checklist of Leader Awareness (RCCOLA) and the Future Expectations of Likely Leader Awareness (FELLA) scale. Six field trials were then conducted with each of seven squad leaders and their respective squads. Based on their monitoring of squad and platoon radios, two independent raters completed separate RCCOLA checklists during each of the 42 total trials, as well as separate FELLA scales after the completion of each trial. Interrater agreement was generally high for both measures. Based on their methods of construction, we can also assume they possess some content-related validity.

### **RR 1804**

#### **Using The Laser Marksmanship Training System To Predict Rifle Marksmanship Qualification**

Smith, M.D., & Hagman, J.D. (AD A415716)

To determine the relation between simulation- (Laser Marksmanship Training System [LMTS]) and live-fire-based rifle marksmanship performance, 186 Reserve Component (RC) Soldiers from Idaho

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and Oregon fired for qualification on a scaled LMTS version and live-fire version of the Army's standard pop-up target qualification course. LMTS was fired under either a dry-fire mode or a Blazer (i.e., sound/recoil replicator) mode. Statistically significant positive linear relations were found (and then validated) between first-run live-fire scores and both LMTS dry-fire- ( $r = .50$ ) and Blazer-based ( $r = .55$ ) scores. These relations were of sufficient strength to permit development of easy-to-use tools for accurately predicting Soldier chances of first-run, live-fire qualification. With these tools, RC marksmanship trainers can implement a competency-based training program where Soldiers most in need of remedial training (i.e., poor shooters) can be quickly identified, and the point at which sufficient training has been provided (i.e., when first-run live-fire qualification is likely) easily determined. These tools also provide RC unit commanders with empirically derived live-fire performance standards needed to support use of LMTS in place of live-fire for rifle marksmanship proficiency validation purposes when standard pop-up target course range facilities are not readily available. Although both tools will serve these purposes, that based on LMTS dry-fire is recommended because of the added expense of firing with Blazer without an accompanying statistically significant increased predictive benefit.

### **RR 1805**

#### **Training The Troops: What Today's Soldiers Tell Us About Training for Information-Age Digital Competency**

Schaab, B.B., & Dressel, J.D. (AD A415297)

Army transformation requires Soldiers who can use information-age digital skills to accomplish tasks and to do essential coordination with others. The objective of this research was to gain insights on best practices for training; this was accomplished by interviewing Soldiers currently trained on, and using the Army's most advanced digital technology. Sixty-two operators of Army Battle Command Systems (ABCS) answered questionnaires and participated in interviews that addressed the Soldiers' perspectives on how best to capitalize on training to meet the demands of the current Army and the Army of the future. Findings showed that Soldiers desire and need additional training on how to integrate their digital systems to accomplish their Army mission. They want this training to be hands on, scenario based, and in a full job flow sequence. Soldiers noted difficulties with different digital systems communicating with each other, which degrades situational awareness. Another concern was the dependence on contract personnel to maintain and troubleshoot equipment. This snapshot of the current state of digital training in U.S. Army units provides insights from the users' perspective that highlights preferred and advantageous training practices.

### **RR 1806**

#### **Using Virtual Environments For Conducting Small Unit Dismounted Mission Rehearsals**

Pleban, R.J., & Salvetti, J. (AD A415298)

This research examined the use of virtual environments as a viable dismounted infantry mission rehearsal tool. Four squads of Soldiers individually conducted two missions that involved clearing a two-story building located at an urban operations training site. Two squads rehearsed the mission in a virtual representation of the exact building they would clear at the urban training site. The remaining squads rehearsed in an actual two-story building that was similar to the one they would clear at the urban training site. Squads executed both missions in each environment. Performance differences between the rehearsal groups across the two 'real-world' missions were

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small to negligible. Group performance differences for fratricides and personnel flagging were negatively affected by simulator constraints. Effectiveness ratings for the two rehearsal modes were clearly dependent on the setting where Soldiers rehearsed. The research showed that while virtual environments show promise for this type of training, a number of interface and technology problems must be overcome. Currently, virtual environments do not appear to be as effective as real-world tactical training for improving skills underlying specific small unit tasks or battle drills. However, these environments may be used effectively at selected stages of training to enhance cognitive skills development.

### **RR 1807**

#### **Recommendations For An Army NCO Semi-Centralized Promotion System For The 21st Century**

Knapp, D.J., Heffner, T.S., & Campbell, R.C. (AD A415686)

The NCO21 research program was undertaken to help the U.S. Army plan for the impact of future demands on the noncommissioned officer (NCO) corps. The performance requirements and associated knowledges, skills, and aptitudes (KSAs) expected of future successful NCOs were used as a basis for developing tools that could be incorporated into an NCO performance management system geared to 21st-century job demands.

The predictor measures include the Armed Services Vocational Aptitude Battery (ASVAB), Assessment of Individual Motivation (AIM), and Biographical Information Questionnaire (BIQ), which are already used in the Army for other purposes. A written Situational Judgment Test (SJT), the Experience and Activities Record (ExAct), Personnel File Form (PFF21), and a semi-structured interview were developed for this project. Two types of rating scale instruments were developed for gathering criterion data against which to validate (evaluate) the predictor measures. The Observed Performance Rating Scales ask supervisors to rate Soldiers on how well they perform in their current jobs. The Expected Future Performance Rating Scales ask supervisors to predict how their Soldiers would perform in specific sets of conditions expected to be characteristic of future Army requirements.

This report summarizes the NCO21 research program and offers recommendations for Army policymakers regarding use of the tools developed through this research.

### **RR 1808**

#### **Web-Based Collaborative Learning: Communication Between Learners Within A Virtual Tactical Operations Center**

Belanich, J., Orvis, K.L., & Wisher, R.A.. (AD A415918)

In 2001, the U.S. Army Armor School designed a blended course for reserve officers with both distributed learning and in-residence components. The distributed portion consisted of an asynchronous phase, where officers completed lessons on their own time, and a synchronous phase, where they used a virtual tactical operations center (VTOC) simultaneously but from different locations. One primary method of communication during synchronous VTOC training was computer-based text messaging. The text messages for five teams consisting of seven to nine members were recorded. The analysis of these text messages revealed that a majority of the communication was related to the operational task. The second most frequent type of text messaging was social in nature, and this type of communication peaked during the initial training

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sessions and during the final session. The least frequent type of communication was technology-related text messages, those where the user was having difficulty with the system and asking for help or a person replying to a help query. Technology-related communication occurred modestly during the initial sessions, but tailed off dramatically as sessions progressed. The students, instructors, and course designer all took part in interviews about their opinions on the distributed learning components of the course. The overall ratings of the distributed -learning portion of the course were positive.

### **RR 1809**

#### **Training And Training Technology Issues For The Objective Force Warrior**

Zipperer, E., Klein, G., Fitzgerald, R., Kinnison, H., & Graham, S.E. (AD A419873)

The Objective Force concept calls for combining what is best from conventional and Special Operations Forces (SOF) cultures. This work identifies successful SOF training approaches and training issues that are potentially appropriate for training Objective Force Warrior (OFW) dismounted combatants and small units. A training questionnaire and detailed interviews were given to nine senior active duty and recently retired NCOs who were chosen for their combat experience, instructor time, and extensive SOF experience. Supplementary interviews were conducted with subject matter experts from the Infantry School and retired officers and NCOs working in high-risk training occupations such as law enforcement special weapons and tactics instructors, security and protective services, and medical professionals. The report contains four complementary sections: OFW relevant SOF training and training technology issues; SOF training techniques for various operational specialties; a listing and description of high-risk/high performance military related trainers in the private sector; and training technology vendors for the areas of sustainability, mobility, survivability, lethality, and situation awareness. The training and training technology issues discussed include time management, command of the basics, skill mastery, combat-focused training, visualization, emphasis on appropriate repetition, and the use of simple aids.

### **RR 1810**

#### **Exploiting FBCB2 Capabilities Through Realistic Feedback**

Leibrecht, B.C. Lockaby, K.J., & Meliza, L.L. (AD A415999)

This report describes the development of a proficiency measurement architecture for the Force XXI Battle Command Brigade and Below (FBCB2). It first explores primary dimensions of FBCB2-enabled performance—high-priority system capabilities, user digital skills and tasks, and network management skills. It then examines key factors that influence digital performance, including echelon, mission phase, unit standing operating procedures, task difficulty, and common performance problems. Finally, it discusses measurement implications of digitization, a comprehensive framework for presenting observation guidelines, and implications for FBCB2-focused After Action Reviews (AAR). The collective findings establish a basic architecture for measuring high-payoff proficiency targets, enhancing performance feedback capabilities, and optimizing the benefits of digital training programs. Two practical tools will help leaders and trainers focus on FBCB2-enabled skills that contribute significantly to combat effectiveness. Key recommendations for expanding the architecture and knowledge base are included.

## **Research Products**

**RR 1811**

### **Training Adaptability In Digital Skills: The Learning Skills Bridge (LSB) Learning Accelerator**

Hess, K.P., Alliger, G., Linegang, M., Meischer, S., Garrity, M.J., Hertel, M., & Bailey, A. (AD A416238)

The objective for this SBIR Phase II project was to increase the degree to which Soldiers are able to apply classroom/computer-mediated training on-the-job and to capitalize on their present digital skills in the acquisition of new and changing digital skills. Aptima, Inc. and the Group for Organizational Effectiveness, Inc. used basic theories of learning transfer to create a two-module training package designed to increase digital skill adaptability. This Learning Skills Bridge learning accelerator training package (LSB) was pilot tested, revised, and re-tested. The study found that training designed to increase basic computer knowledge (e.g., the LSB) does result in learning transfer to the Advanced Field Artillery Tactical Data Systems (AFATDS).

Specifically, the LSB training eliminated any group differences based on prior computer experience, and thus compensated for deficient computer experience. Also, participants scored significantly higher on the measures of AFATDS networks and AFATDS visualization and Mapping after LSB training than they did before the training. Further, 88.8% of participants reported that the LSB training improved their understanding of AFATDS. From these results it was concluded that generalizable, transferable digital skills taught in the context of device- and job-specific goals (such as with the LSB) has promise in increasing adaptability in the use of those digital skills.

## **Research Products**

### **RP 2003-01**

#### **Multi-Compo Tool Kit**

Taylor, T., Hagman, J.D., Lockaby, K., Randolph, P., Caster, B., & Leibrecht, B.C.  
(AD M001465)

This product is a web-interactive, compact disc (CD)-based tool kit containing U.S. Army Reserve (USAR)-related information included to help leaders, at corps through company level, meet the challenges of Active/Reserve Component (AC/RC) integration within a multiple-component (multi-compo) unit environment. The tool kit contains six sections of need-to-know information: (1) A multi-compo handbook to help leaders get to know the operational environment of the USAR and to serve as a foundation for establishing standing operating procedures for multi-compo units, (2) tips for achieving successful integration that address the causes, effects, and recommended solutions to problems that may occur in a multi-compo environment in the areas of command climate, personnel, training, logistics, and finance/funding, (3) sponsorship checklists for ensuring the seamless transition of USAR Soldiers newly assigned to multi-compo units, (4) mobilization information to help multi-compo unit leaders during each phase of the mobilization process, (5) links to supporting organizations, and (6) a list of sources used to support tool kit development.

### **RP 2003-02**

#### **Think Like A Commander Prototype: Instructor's Guide To Adaptive Thinking**

Lussier, J.W. Shadrick, S.B., & Prevou, M.I. (AD A413046)

This report is the second of two research products presenting the methods and software for training adaptive battlefield thinking. The first research product presented the prototype software training application. This report is an instructor's guide that provides an overview of adaptive battlefield thinking skills and documents the methods for employing the software application and administering the training. The report provides an introduction to adaptive thinking and the Adaptive Thinking Training Methodology and details the use of deliberate practice in training cognitive skills. Detailed information about the prototype vignettes are presented with comprehensive instructor materials needed to implement the training.

### **RP 2003-03 Canceled**

### **RP 2003-04**

#### **Research Observations and Lessons Learned for the Future Combat Systems**

Campbell, C.H., Throne, M.H., Black, B.A., & Lickteig, C.W. (AD A412016)

This brief summarizes some of the important observations and lessons learned from training research and development conducted by the U.S. Army Research Institute for the Behavioral and Social Sciences (ARI) over the past 15 years. Its purpose is to assist Future Combat Systems (FCS) designers and developers as they formulate plans for the systems and for the training that will accompany the systems. The topic summaries cover the need for a Master Training Plan, training development and implementation concerns, training and performance support and system issues, and a few non-training and non-system observations. The reference list (Appendix B) gives the complete citation for readers who need more information, and the

## **Research Products**

reference matrix at Appendix C shows which documentation sources each topic summary is based on. In selected cases, more complete summaries on specific techniques or principles are provided in Appendix D. Finally, Appendix E contains a compendium of research issues that remain to be investigated.

### **RP 2003-05**

#### **A Practical Guide for Exploiting FBCB2 Capabilities**

Leibrecht, B.C., Lockaby, K.J., & Meliza, L.L. (AD A415997)

This document provides two products developed to support performance feedback regarding unit employment of the platform-based digital command, control, and communication system known as Force XXI Battle Command Brigade and Below (FBCB2). The Leader's Primer for Exploiting FBCB2 describes twenty-two major FBCB2 capabilities, the tactical significance of each capability, the digital operator and user tasks involved in employing each capability, the probability that the capability is being exploited, and the evidence that the capability is not being exploited. The FBCB2 Exploitation Tool identifies fifty digital performance goals and the tactical significance of each goal. The tool identifies the echelon(s) to which each goal applies, the trigger events that call for observation of unit performance relevant to the goal, and guidance regarding where to obtain the data needed to assess unit performance. Data are obtained by using one or more of the following mechanisms: observing information on an FBCB2 system; viewing breakouts of message traffic; viewing breakouts of user interactions with systems; and asking questions of warfighters.

### **RP 2003-06**

#### **Combat Leaders' Guide (CLG) Leader Handbook**

Salter, M.S., & Centric, J.H. (AD A 420746)

The history of the initial Combat Leaders' Guide (CLG) project began in 1985 and continues to the 2003 reprint of the CLG. The CLG is a pocket-sized job performance aid, useful to any Soldier. Over 50,000 CLGs have been made available to Soldiers in hard copy, and it is available at the U.S. Army Research Institute web site at <http://www.ari.army.mil>.

## **Special Reports**

### **S 53**

#### **Training for Future Operations: Digital Leader's Transformation Insights**

Johnston, J.C., Leibrecht, B.C., Holder, L.D., Coffey, R.S., & Quinkert, K.A. (AD A412717)

This report results from a study of key factors that are likely to shape the training environment of the future force. The study aimed to translate lessons learned by digitization leaders into high-payoff recommendations for training the Objective Force. The study team interviewed senior leaders in the Army's First Digital Division and I Corps, capturing previously undocumented knowledge acquired through practical experience. Digital training experts, including two retired General Officers, then analyzed the interview transcripts to generate implications for training the future force. In the process, the experts injected their own knowledge and insights to expand the understanding of issues and requirements. Finally, the team developed specific recommendations intended to give transformation leaders a distinctive training advantage. The practical insights and recommendations point to initiatives the Army can take to establish Objective Force training as a decision combat multiplier.

### **S 54**

#### **Fiscal Year 2003 Program**

U.S. Army Research Institute (AD A412547)

The mission of the U.S. Army Research Institute for the Behavioral and Social Sciences (ARI) is to maximize individual and unit performance and readiness to meet the full range of world-wide Army missions through advances in the behavioral and social sciences. The purpose of this document is to describe the work that ARI will accomplish in its Fiscal Year 2003 program.

### **S 55**

#### **U.S. Army Research Institute Program In Basic Research 2002-2003**

U.S. Army Research Institute (AD A409096)

The purpose of this document is to communicate the annual progress for each individual research project in the Research and Advanced Concepts Office (RACO) basic research program at the United States Army Research Institute for the Behavioral and Social Sciences (ARI). The summaries contained herein are written by the scientists who are performing the work and provide a snapshot of their continuing efforts. In addition, RACO conducts a more detailed in-progress review of each project each year. If successful, the projects within RACO's basic research program will lay the foundations for many of ARI's future applied behavioral research efforts. These summaries serve as guideposts for ensuring that our basic research results transition to ARI's applied research programs.

## **Special Reports**

### **S 56**

#### **Enhancing U.S. Army Aircrew Coordination Training** Katz, L.C. & Grubb, G.N. (AD A415767)

This report summarizes the objectives and outcomes of ongoing team training research and development under the guidance of the U.S. Army Research Institute for the Behavioral and Social Sciences (ARI). The Aircrew Coordination Training Enhancement (ACTE) program is an applied research project that applies experience, innovation, and technology to research the operational issue, "Can interactive multimedia courseware using web-based distribution provide the realism and relevance necessary for effective behavior-based team training and evaluation?" The report briefly describes prototype products from the first phase of research as two interactive multimedia courses of instruction with supporting training materials for usability assessment, evaluation, and validation testing by aviation units in the field. User testing and validation results indicate high levels of acceptance for both the training and performance evaluation components. Initial testing of the prototype courseware on the Army's distance learning suite supports both the web-based and instructor facilitated delivery strategies. The final prototype courseware and support materials are ready for refinements to meet certification requirements and subsequent fielding. Training effectiveness results suggest research into applying the ACTE courseware design and delivery model to accelerate the fielding of priority training systems to meet the Army's critical training needs.

### **S 57**

#### **Project Train Mod: Modernizing Soldier Training Through Research** Evans, K.L. (AD A416475)

This report summarizes and highlights the major findings of 11 separate lines of investigation across four general areas of applied training research: training modernization (5), decision making (2), situation awareness (2), and computer-based training for digital systems. The training modernization section focuses on training research for a variety of new systems and technologies, including the Land Warrior System and the M2A3 Bradley Fighting Vehicle. The section on decision making describes the development of new computer-based training tools for learning the Military Decision-Making Process (MDMP). It also provides an overview of research aimed at teaching platoon leaders to make better decisions during urban operations. The situation awareness (SA) section highlights the creation of a comprehensive infantry SA model, as well as the development and field testing of three new SA measures. Finally, the section on computer-based training presents survey research findings on the computer backgrounds of different groups of Soldiers, as well as the results of a series of learning experiments that assessed the effectiveness of different computer-based instructional design features for training on new digital systems.

## **Study Reports**

### **SR 2003-01**

#### **Training Requirements of Battle Staff NCOs in Digital Units**

Felton, R.J., Schaab, B.B., & Dressel, J.D. (AD A415442)

The United States Army is transforming to a versatile force with the capabilities, particularly the digital technology, necessary to optimize the flow of information and enhance situational awareness. One vital enlisted position affected by the implementation of these digital technologies and equipment is assigned to Battle Staff Noncommissioned Officers. The Battle Staff Noncommissioned Officer course trains Noncommissioned Officers to be integral members of battle staffs in analog units. The current institutional training does not include instruction on how to use digital technology to leverage performance in Tactical Operations Centers. To determine if the role of the Battle Staff Noncommissioned Officer changed with the inception of digital technology, data were collected from 522 Battle Staff Noncommissioned Officers. Findings, based on surveys, observations, and interviews, suggest the need to include digital training within the Battle Staff Noncommissioned Officers Course and the need for system integration training to support the change in the role of the Battle Staff Noncommissioned Officer.

### **SR 2003-02**

#### **Impact of the Army Continuing Education System (ACES) on Soldier Retention and Performance: Data Analyses**

Sticha , P.J., Dall, T.A., Handy, K., Espinosa, J., Hogan, P.F., & Young, M.C. (AD A415373)

This evaluation of the Army Continuing Education System (ACES), considered the following programs: (a) Tuition Assistance (TA) (b) Functional Academic Skills Training (FAST), (c) Military Occupational Specialty Improvement Training (MOSIT), (d) Noncommissioned Officer (NCO) Leader Skill Enhancement Courses, and (e) the Armed Forces Classification Test (AFCT). The assessment of the effectiveness of these programs is based on their ability to enhance Soldier performance and increase the prospects of promotion, as well as to reduce attrition and increase reenlistments.

The evaluation data came from a longitudinal administrative database that tracked a three-year accession cohort over a six-year period and an NCO database including self-reported participation in ACES programs, promotion information, and observed performance ratings. The analysis was designed to separate effects of participant characteristics from the effects of the program, and to control for differences in the opportunity and propensity to participate in ACES.

Participation in TA and FAST were associated with an increase in the probability of first term reenlistment. FAST participation was also associated with lower first-term attrition. Participation in several ACES programs showed positive effects on measures of performance and promotion potential.

### **SR 2003-03**

#### **Basic Officer Leader Course (BOLC) Cadre Train-up**

Salter, M.S., Wampler, R.L., Centric, J.H., Dlubac, M.D., & Beal, S.A. (AD B291525)

This report documents the Basic Officer Leader Course (BOLC) cadre train-up conducted at Fort Benning, GA from Sept. 24-Oct. 25, 2001. The BOLC Phase II of the newly designed three-phased initial entry officer training program brings all new Army lieutenants to a common site for a

## **Study Reports**

standardized program of instruction heavily focused on leadership, counseling and field craft in a hands-on field environment after their pre-commissioning training (Phase I). After completion of Phase II, lieutenants attend BOLC Phase III, to learn their branch specific skills. Since BOLC II has students from multiple branches, the BOLC II cadre must similarly be a mixture of branches and Military Occupational Specialties. This report describes the initial attempt at a cadre train-up designed to bring officers and non-commissioned officers from different locations to a common level of understanding. Results show this train-up was worthwhile, with some notable shortfalls, all of which can be remedied before any other train-ups are undertaken.

### **SR 2003-04**

#### **Overall Assessment And Recommendations: Basic Officer Leader Course (BOLC) Phase II Pilot Classes**

Salter, M.S., Wampler, R.L., Centric, J.H., & Dlubac, M.D. (AD B291526)

This paper documents the overall assessment and recommendations from the Basic Officer Leader Course (BOLC), Phase II, conducted at Fort Benning, GA. A part of the transformation of the officer training system, BOLC is a 3-phased program. Phase I is pre-commissioning. Phase II provides a branch immaterial common site for a standardized program of instruction heavily focused on leadership, counseling, Warrior Ethos, and field craft in a hands-on field environment. After BOLC Phase II, lieutenants attend Phase III of their training, traditional officer basic courses (OBCs), to learn branch specific skills. The iterative development of the BOLC Phase II program permitted changes over time. The program of instruction has improved markedly, and the entire BOLC process is smoother than before. Problem areas (cadre selection, course standards, information dissemination) can be remedied. Initial feedback from the lieutenants themselves and from their OBC schools on the value of BOLC is mixed. Since the BOLC graduates have been in their units for so short a time, it is difficult to determine the overall effectiveness of the program but there have been many positive comments. There is still work to be done before full implementation.

### **SR2003-05**

#### **Assessment of the Basic Officer Leader Course (BOLC) FY02 Pilot Classes**

Salter, M.S., Centric, J.H., Wampler, R.L., Rich, K.B., & Beal, S.A. (AD B291389)

This paper documents the Phase I Basic Officer Leader Course (BOLC), Pilots 3 and 4, conducted at Fort Benning, GA during FY02. BOLC Phase I is part of the newly designed two-phased initial entry officer training program. BOLC Phase I brings all new lieutenants to a common site for a standardized program of instruction heavily focused on leadership, counseling and field craft in a hands-on field environment. After completion of BOLC Phase I, lieutenants attend Phase II of their training, to learn their branch specific skills. Results show the Pilots 3 and 4 iterations were able to capitalize on lessons learned from previous iterations, and the overall BOLC intent appears to be met. Problem areas within each of the Pilots can be remedied. The program of instruction has improved markedly, and the BOLC process is much smoother than before. As earlier, many BOLC graduates do not appear to value this training while it is occurring, but post-BOLC interviews with BOLC graduates show moderating attitudes. After four Pilots, deficiencies have been identified, and can be fixed.

## **Study Reports**

### **SR 2003-06**

#### **Basic Officer Leader Course (BOLC): Follow-On Interviews and Surveys**

Salter, M.S., Wampler, R.L., Centric, J.H., & Dlubac, M.D. (AD B291527)

This paper documents follow-on data collection related to the Basic Officer Leader Course (BOLC), a newly designed three-phased initial entry officer training program. BOLC Phase I is pre-commissioning training. BOLC Phase II brings all new lieutenants to a common site for a standardized program of instruction heavily focused on leadership, counseling and field craft in a hands-on field environment. Phase III is the traditional Officer Basic Course (OBC) where lieutenants learn their branch specific skills. The initial pilots of Phase II were conducted at Fort Benning, GA; this report provides limited follow-on data from the lieutenants and their cadre, at the end of their OBCs and in their units, and from their receiving commanders. The data collected were very limited and BOLC Phase II's long-term effects are unknown. Initial feedback indicates that for some lieutenants, BOLC has been an extremely valuable experience.

### **SR 2003-07**

#### **Assessment of the Basic Officer Leader Course (BOLC) FY01 Pilot Courses**

Salter, M.S., Centric, J. H., & Beal, S.A. (AD B291374)

This paper documents two pilot iterations of the Basic Officer Leader Course (BOLC) conducted at Fort Benning, GA during FY01. BOLC represents Phase I of the newly designed two-phased initial entry officer training program, the first step in the Officer Education System. BOLC brings all new lieutenants to a common site for a standardized program of instruction heavily focused on leadership, counseling and field craft in a hands-on field environment. After completion of BOLC, lieutenants attend Phase II of their training, to learn their branch specific skills. Results show the initial iterations of BOLC were handicapped by inadequate resources, a shortened planning cycle, and a lack of information. The program of instruction was in flux, and because the two pilot courses overlapped, only a few lessons learned from the first iteration could be applied in the second. However, interviews with BOLC graduates several months after the course indicate that the BOLC intent, producing confident and competent small unit leaders, is probably being met. Deficiencies in the first two courses have been identified, and can be fixed.

### **SR 2003-08**

#### **Off-Line Field Test Design for Evaluating Two Approaches to Person-Job Matching: The Army Recruit Quota System (REQUEST) and the Enlisted Personnel Allocation System (EPAS)**

Lightfoot, M.A., & Diaz, T.E., & Greenston, P.M. (AD A418027)

The Enlisted Personnel Allocation System (EPAS), initially developed through a multi-year research and development project conducted by the U.S. Army Research Institute for the Behavioral and Social Sciences (ARI), is the latest tool available to the Army for improving the classification process. Designed to be a subsystem of the Recruit Quota System (REQUEST), EPAS is a person-job-matching (PJM) method that optimizes the assignment of recruits to entry-

## **Study Reports**

level military occupational specialty (MOS) training. It goes beyond REQUEST, the Army's present approach to PJM. REQUEST identifies high priority MOS for which an applicant meets the minimum Aptitude Area composite score qualifications. In addition, EPAS identifies those MOS in which an individual is likely to perform with the greatest effectiveness, while meeting overall Army accession goals and filling critical MOS.

A PC-EPAS prototype was created and evaluated based on laboratory simulations of the Army's classification process in FY 1998. The results of laboratory classification simulations provided evidence that EPAS can improve the mean predicted performance (measured as the average Aptitude Area composite score of recruits in their assigned job training) of a fiscal year recruit cohort, while simultaneously meeting Army enlistment requirements. Based on these positive laboratory results, ARI developed a production version of EPAS in FY 2000. The planned field test will examine the likelihood of realizing the laboratory findings in an "operational" environment, using EPAS linked as a subsystem to REQUEST and to actual transactions data within a simulation framework. This report describes the planned field test design.

## **Study Notes**

### **SN 2003-01**

#### **Evaluation of the Buddy Team Assignment Program**

Ramsberger, P.F., Legree, P., & Mills, L. (AD A408486)

All Infantry Soldiers are assigned a battle buddy during One Station Unit Training (OSUT). In 2000, a pilot program was initiated in which some buddy pairs were also assigned together to their first operational units. The hope was that a familiar face would lessen the stress associated with making this transition, and thereby lower attrition rates. During the pilot period, Soldiers with Military Occupational Specialty 11M (Fighting Vehicle Infantryman) were either assigned to the Buddy Team Assignment Program (BTAP) or designated as controls for research purposes. Over a 3-month period, Soldiers at Fort Benning, GA were surveyed just before graduating from OSUT and asked a variety of questions about their experience, particularly focusing on their battle buddies. Parallel surveys were administered to BTAP and control Soldiers in the field. Results showed that battle buddies had a highly positive impact during OSUT and were generally well liked. This impact was reduced once Soldiers were in the field, although there was still greater evidence of a positive than a negative impact. The results suggest that the degree to which Soldiers like one another and the level at which they are assigned together (e.g., squad, platoon) have a major impact on program outcomes.

### **SN 2003-02**

#### **Determining Composite Validity Coefficients for Army Families**

Zeidner, J., Johnson, C., Vladimirskey, Y., & Weldon, S. (AD A409870)

The broad goal of the present research (and the first study completed in response to the September 2001 Expert Panel recommendations) is to compute composite validity coefficients, using criterion data derived from the 1987 - 1989 Skill Qualifications Test program, for the 7-test ASVAB for 150, 17, and 9 job family structures. These are the structures underlying ongoing classification research. The specific research objectives are as follows:

1. To compute the 7-test ASVAB LSE (least squares estimate) composite validity coefficients for the first-tier 150 job family structure. These correlation coefficients are corrected, first, for unreliability of the criterion and, then, for restriction in range effects due to assignment from an Army input population to MOS samples. The coefficients are computed for both back (biased) and cross (unbiased) validities of LSE composites.
2. To compute ASVAB composite validity coefficients for the youth population in the 150 job family structure. This involves a correction for the Army input and then a separate restriction in range correction due to selection from the youth population into the Army. Again, the coefficients are computed for both back and cross validities.
3. To compare mean validity coefficient results obtained for the 150 job families with those obtained earlier for the 66 MOS families. Although there was a substantial overlap in MOS between the two data sets, the 66 MOS study was computed on data that was collected several years earlier than was the 150 family study.
4. To compute the weighted aggregation of test composite validity coefficients for the aggregated MOS corresponding to each of the 17 job family composites of the second tier and for each of the 9 (interim) composites. Validities are first corrected for the Army input population and then corrected for the youth population for both back and cross samples.

## **Study Notes**

### **SN 2003-03**

#### **Determining Mean Predicted Performance For Army Job Families**

Zeidner, J., Johnson, C., Vladimirska, Y., & Weldon, S. (AD A410612)

The present study is designed to obtain mean predicted performance (MPPs) for the 9- and 17-job families, using composites based on 7 ASVAB tests, using a triple cross-validation design permitting completely unbiased estimates of MPP. While the authors have previously computed MPPs for 9 and 17 family composites, they have not been computed for composites that have had all hierarchical effects removed by a transformation to the Army conventional standard score (ACSS) scale (with its use of equal means and equal standard deviations).

The specific research objectives are as follows:

1. To compute regression weights for the 7 ASVAB tests to form assignment composites corresponding to the two alternative second-tier structures (9 or 17 families) and to determine the classification efficiency in terms of MPP that would result from the use of all positive weights and the conversion of the composite scores into the ACSS scale. Weights are corrected first for unreliability of the criterion and, then, for restriction in range effects due to assignment from an Army input population to MOS samples. The weights are applied to test scores of independent samples to obtain back (biased) and cross (unbiased) MPPs.
2. To obtain MPPs for the two sets of job families for the youth population as described in (1) above. This involves a correction due to assignment from the Army input population into Army jobs, and then a separate restriction in range correction due to selection from the youth population into the Army.
3. To compare MPPs for the two sets of job families for the Army Input/youth populations.
4. To evaluate the relative value of the two sets of job families taking into account MPPs and composite validity coefficients, used in establishing cut scores for the ACSS scale.

### **SN 2003-04 Canceled**

### **SN 2003-05**

#### **Impact of the Army Continuing Education System (ACES) on Soldier Retention and Performance: Database Development**

DiFazio, A.S., & Sticha, P.J. (AD A415293)

The Army Continuing Education System (ACES) provides education, training, testing, and counseling opportunities to tens of thousands of service members each year. The mission of ACES is to promote lifelong learning opportunities that sharpen the competitive edge of the Army by providing and managing quality educational programs and services. The United States Total Army Personnel Command (PERSCOM), the developers and administrators of ACES, has requested an evaluation to demonstrate the value of ACES to the Total Army. This evaluation consists of two phases. The first phase involved the development of detailed database and evaluation plans. Phase two involves the implementation of the database and evaluation plans. This report describes the data development portion of the phase two effort, which resulted in a comprehensive longitudinal evaluation database. The report presents an overview of the data structure, summarizes the activities by which the database was constructed, and discusses some of the lessons learned in the development process.

## **Study Notes**

**SN 2003-06**

### **Impact of the Army Continuing Education System (ACES) on Soldier Retention and Performance. Phase I: Plan Development**

Sticha, P.J., DiFazio, A.S., Dall, T.A., Handy, K., & and Heggestad, E.D (AD A415299)

The U.S. Total Army Personnel Command requested an evaluation of the Army Continuing Education System (ACES) to demonstrate its value in improving enlisted Soldier retention and performance. This report describes the planning of the evaluation, including a review of the relevant research literature and the development of evaluation and database development plans.

The research literature provides limited coverage of continuing education programs. Results indicate that those who participate in continuing education tend to be better qualified than those who don't. The research suggests that participation in continuing education increases the likelihood of reenlistment and improves performance. The effect remains at a reduced magnitude when other factors are controlled statistically.

The evaluation plan addresses five ACES programs: (a) the Army Tuition Assistance (TA) Program, (b) the Service members Opportunity Colleges Army Degree (SOCAD) Program (c) the Functional Academic Skills Training (FAST) program, (d) Military Occupational Specialty (MOS) Improvement Courses, and (e) Non-commissioned Officer (NCO) Leader Development Courses. The methodological approach addresses several potential evaluation problems, including non-random assignment, censored data, missing data, measurement error, and unobserved heterogeneity. The database development plan specifies the variables needed to conduct the evaluation, and identifies data-building procedures that will result in an analytically relevant evaluation database.

**RN 2003-01****Contract for Manpower and Personnel Research and Studies II (COMPRS-II) Annual Report-Year Four**

Human Resources Research Organization (HumRRO) (AD A406424)

This report documents and summarizes the activities of the first 4 years of a 5-year (1 base year and 4 option years) project to provide the U.S. Army Research Institute (ARI) non-personal, short- and medium-term scientific and technical support services in the solution of problems related to manpower and personnel. The program is referred to as the Contract for Manpower and Personnel Research and Studies II (COMPRS-II). HumRRO's primary responsibilities are to administer COMPRS-II for ARI under firm fixed-priced contracts by managing three inter-related tasks: (a) managing the COMPRS program in accordance with established operating procedures; (b) receiving and processing individual Statements of Tasks from ARI; and (c) managing, reporting progress on, and documenting the completion of delivery orders.

**RN 2003-02****Ratings of Decision-Making Attributes in a Junior Leader Course**

Beal, S.A. (AD A408031)

Cadre and students provided ratings of decision-making attributes during two junior leader courses. Results showed that cadre ratings of students' attributes improved over time, whereas student self-ratings did not show improvements. Initial student ratings tended to be inflated. Cadre ratings were more conservative than student ratings regardless of rating time. Research on naturalistic decision-making and self-appraisal were considered for the purposes of interpreting and explaining discrepancies across rating sources. It was suggested that discrepancies arose because of differences in raters' experience, knowledge, and because of inconsistent or ambiguous performance comparison standards.

**RN 2003-03****Low-Cost PC Gaming and Simulation Research: Doctrinal Survey**

Tarr, R.W., &amp; Morris, C.S., &amp; Singer, M.J. (AD A408645)

The U.S. Army Simulation, Training and Instrumentation Command (STRICOM) established a program investigating novel techniques for low-cost/complexity training devices. The U.S. Army Research Institute for the Behavioral and Social Sciences contributed to this program by supporting the investigation of doctrinal issues in low-cost personal computer (PC) gaming. The Institute for Simulation and Training at the University of Central Florida developed an approach for defining game parameters and surveying subject matter experts (SMEs) on doctrinal correctness of game experiences. Doctrinal correctness combines and interacts with cognitive skills and decision-making skills gains in complex ways that make the selection of games for reinforcing training through training a complicated trade-off. Based on prior work, PC games were selected for Infantry and Armor tasks and evaluated for application and doctrinal correctness. The evaluations for the Infantry aspects of *Rogue Spear: Covert Ops™* indicated that the game could be used for tactical movement, tactical scenario, and room clearing exercises. The evaluation of *Steel Beasts™* were positive in terms of gunnery elements, but there

were sufficient doctrinal errors that the overall game was judged to not be useful. The results of this and other efforts indicate the potential usefulness of commercially available off the shelf PC games, although further studies are needed in order to establish guidelines and characteristics for integrating selected aspects of games into ongoing instructional approaches.

#### **RN 2003-04**

#### **Tacit Knowledge and Practical Intelligence: Understanding the Lessons of Experience**

Hedlund, J., Antonakis, J., & Sternberg, R.J. (AD A412016)

This report addresses the role of practical intelligence and tacit knowledge in understanding how individuals learn from experience and develop expertise. We present background on the notion of practical intelligence as an alternative to conventional conceptualizations of intelligence, and the exploration of the acquisition and utilization of tacit knowledge as elements of practical intelligence. We review research on practical intelligence and, in particular, highlight findings from over 15 years of research on tacit knowledge. We then address new directions aimed at understanding how individuals learn from experience and acquire tacit knowledge, and present new approaches for identifying and promoting managerial and leadership potential that are based on ongoing research on practical intelligence.

#### **RN 2003-05**

#### **Reflections on Blended Distributed Learning: The Armor Captains Career Course**

Bonk, C.J., Olson, T.M., Wisher, R.A., & Orvis, K. (AD A408041)

The purpose of this study was to investigate how various distributed learning technologies impacted the training of Armor officers in an advanced course, the Captains Career Course. There were three phases to this course – asynchronous, synchronous, and residential. At the completion of one complete course iteration, two groups of students, as well as three instructors and the course advisor, were interviewed regarding their experiences with the online learning components. Each group mentioned distinct advantages and disadvantages from the different online components including greater and timelier feedback, realistic scenarios, downtime due to technology problems, and an overwhelming choice of tools and options. Ten key Web-based instruction considerations or issues were mentioned across participants and several recommendations for improving this program and building similar ones were provided.

#### **RN 2003-06**

#### **Gesture Recognition System for Hand and Arm Signals**

Lampton, D.R., Knerr, B.W., Clark, B.R., Martin, G.A., Washburn, D.A., & and Rosas-Anderson, C.J. (AD A408459)

This report describes an evaluation of a computer system for recognizing human hand and arm signals as a means of interacting with virtual environments. The system consists of two video cameras, software to track the positions of the gesturer's head and hands, and software to recognize gestures by analyzing the position and movement of the hands. The software was hosted on a standard PC. A set of 14 gestures from Army Field Manual 21-60, Visual Signals, was used to test the system. Ten participants individually performed each gesture twice as discrete trials, with a brief rest period between each trial. The average recognition rate was 68%.

The highest average recognition rate for an individual was 86%; the lowest was 57%. Three of the 14 gestures were always recognized correctly, and one was never recognized correctly. While no tracking failures occurred for four of the gestures, tracking failures ranged from 10% to 100% for the other ten. The system's capabilities for untagged optical tracking and recognition of gestures involving certain types of repetitive motion advance the state-of-the-art in computer-based gesture recognition. However, for training applications, substantial improvements are needed in tracking reliability and recognition of gestures involving the depth dimension.

**RN 2003-07**

**Toward an Understanding of Team Performance and Team Cohesion Over Time Through the Lens of Time Series Analysis**

McIntyre, R.M., Strobel, K., Hanner, H., Cunningham, A., & Tedrow, L. (AD A409456)

This final report summarizes the results of two phases of research involving the effects of theory-based teamwork training on team cohesion and team performance. In the first phase, the research used a relatively straightforward pre-training, post-training, and post-post-training design to determine the effects of theory-based teamwork process training on team cohesion. Results indicated significant and reasonably long-lasting effects on team cohesion as measured by the System for the Multiple Level Observation of Group (SYMLOG) measurement system. The second phase of the research was extremely labor intensive. It involved the use of 11 student teams who participated in an advanced undergraduate psychology course. A somewhat surprising finding was that team performance and team cohesion were not related as expected. The four studies in two phases provided more questions than answers.

**RN 2003-08**

**List of U.S. Army Research Institute Research and Technical Publications**

U.S. Army Research Institute (AD A419849)

The means of dissemination of the results of ARI's research and development/studies and analysis program vary widely depending on the type of work, the subject matter, and the sponsor/proponent. Typically, major findings with immediate policy and procedural implications are briefed to sponsors and proponents in order to enable timely implementation. This is followed up with complete documentation in the form of research and technical publications such as the ones listed here. In many cases, these documents represent the actual item handed off to the sponsor/proponent; this is particularly true of the Research Product category. In other cases, results are published in order to provide a complete record of the work done, and for future reference by researchers doing work in the same or similar areas.

This annotated list for FY02 provides an idea of both the depth and scope of the ARI research effort, and is a valuable resource for anyone interested in military psychology from either a scientific or operational perspective.

**RN 2003-09****Assessment of Right Conduct (ARC) Administrator's Manual**  
Kilcullen, R., White, L., Sanders, M., & Hazlett, G. (AD B288364)

This report summarized the development and validation of the Assessment of Right Conduct (ARC), a paper-and-pencil test that is designed to predict counterproductive behavior. Unlike many 'overt' integrity tests that ask directly about past criminal behavior or unethical conduct, the ARC is a 'covert' test that predicts counterproductive tendencies using more subtle questions aimed at the psychological characteristics that underlie delinquent behavior.

The ARC has been validated for predicting various indices of counterproductive behavior among Army recruits, correctional specialists, inmates, and Special Forces applicants.

The ARC is intended for use in settings where it is impractical to assess each candidate on a one-to-one basis. Candidates who are identified by the ARC as being at risk for counterproductive behavior should be scheduled for a follow-up assessment with a clinical psychologist. The ARC is not intended for use as the sole indicator of delinquency propensity. To assist with the follow-up assessment, the ARC computerized test results identify specific areas of concern, and the ARC follow-up interview guide helps assessors explore these areas of concern in greater detail.

**RN 2003-10****Virtual Environment Cultural Training for Operational Readiness: VECTOR**  
Weiland, W.J., Deaton, J., Barba, C.A., & Santarelli, T.P. (AD B288647)

This report describes the effort and results of a Phase I SBIR research program known as Virtual Environment Cultural Training for Operational Readiness (VECTOR). The purpose of VECTOR is to enable the use of virtual environments for training cross-cultural skills, such as language and customs, by providing synthetic actors that exhibit correct cultural behaviors. Accomplishing this task draws on technologies for modeling cognition and emotion, and automated speech recognition and synthesis. A key thrust of the Phase I effort was to develop approaches and techniques to represent cultural factors and embed these within existing cognitive modeling technologies that could drive synthetic actors and associated avatars in a virtual environment.

**RN 2003-11****Measurement Methods for Human Performance in Command and Control Simulation Experiments**  
Sanders, W.R. (AD A413273)

The U.S. Army's proposed Future Combat System of Systems (FCS) will include automated Command and Control (C<sup>2</sup>) capabilities that will allow tactical commanders, assisted by a small command group, to effectively lead a future force composed of large numbers of manned and robotic elements. This paper describes research conducted by the U.S. Army Research Institute (ARI) to develop measurement methods to enhance the existing Human Functional Analysis (HFA) approach (Sanders, Lickteig, 2002) for estimating human performance requirements associated with FCS C<sup>2</sup> design concepts. Measurement techniques are demonstrated that can address C<sup>2</sup> human performance requirements through the evaluation of verbal communications, Human-Computer Interaction (HCI) behavior events, and subjective survey data. Specifically,

automated word count, and task-time estimation methods were applied to existing HFA data sets to provide estimates of the frequency and time duration of verbal communications for individual members of the FCS C<sup>2</sup> command group, and task time estimates for all HCI actions. Data gathered in a series of U.S. Army battle simulation experiments were reanalyzed to demonstrate how the new methods can provide estimates of human performance that support decisions regarding workload, task allocation, and training requirements.

**RN 2003-12**

**Gender Integration of Basic Combat Training and Career Intent of Enlisted First-Term Soldiers**

Lee, J.K., & Tremble, T.R. (AD A415813)

Past findings summarized by Mottern, Foster, Brady, and Marshall-Mies (1997) have supported the conclusion that the gender-integrated approach to training does not adversely influence the basic-training performance of either female or male Soldiers. The research here investigated differences between Soldiers with single gender or gender-integrated basic training in their career intentions and Army adaptation over the full course of initial entry training (IET), that is, basic and advanced entry training. Analyses of variance revealed that differences by type of training and Soldier gender were relatively small but tended to indicate more positive outcomes for the Soldiers (males and females) having had gender-integrated basic training. Despite a slight decrease over time, responses at the end of IET remained positive, and the decline in adaptation tended to be less frequent for males with gender-integrated basic training. In general, the attitudes of Soldiers in different training environments were similar and showed similar changes over time. Thus, the overall pattern supports earlier conclusions (Mottern et al., 1997; Harrell & Miller, 1997) and suggests that over the full course of IET, the gender integration of basic training is not associated with more negative effects in terms of the career intent or adaptation of male or female Soldiers.



## Index of ARI Publications

### Abbreviations

TR	Technical Report	SR	Study Report
RR	Research Report	SN	Study Note
RP	Research Product	RN	Research Note
S	Special Report		

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### **FY 2003 Journal Articles**

- Karrasch, A.I. (2003). Antecedents and consequences of organizational commitment. *Military Psychology, 15*(3), 225-236.
- Legree, P. J. (2003). Buckle-up for safety. *Contemporary Psychology, 48*, 635-636.
- Legree, P. J., Heffner, T. S., Psotka J. & Martin, D. E. (2003). Traffic crash involvement: Experiential driving knowledge and stressful contextual antecedents. *Journal of Applied Psychology, 88*, 15-26.
- Schumm, W. R., Gade, P. A., & Bell, D. B. (2003). Dimensionality of military job satisfaction items: An exploratory factor analysis from the spring 1996 Sample Survey of Military Personnel. *Psychological Reports, 92*, 809-819.
- Schumm, W. R., Gade, P. A., & Bell, D. B. (2003). Dimensionality of military professional values Items: An exploratory factor analysis of data from the spring 1996 Sample Survey of Military Personnel. *Psychological Reports, 92*, 831-841.

### **FY 2003 Outside Publications**

- Moses, F. L., Schaab, B., & Hayes, P. B. (2003, January). Interim Brigade Combat Team: Training TOC Operators. *Army Acquisition, Logistics, and Technology, 31*-33.
- Payne, S.C., Huffman, A.H., & Tremble, T.R. Jr. (2002, December). The influence of organizational commitment on officer retention: A 12-year study of U.S. Army Officers. *IBM endowment of the business of government*.

### **FY 2003 Conference Papers**

- Belanich, J. Wisher, R. A., & Orvis, K. L (2002, December). *Text communication during online tactical operations center training*. A poster presented at the U. S. Army Science Conference, Orlando, FL.
- Belanich, J., Wisher,R., & and Orvis, K. (2003, August). *Using a question generation approach to improve web-based collaborative learning*. Paper presented at the 19<sup>th</sup> Annual Conference on Distance Teaching and Learning, Madison WI.
- Barnett,J. (2003, August). Future combat systems: The challenge of Soldier-systems integration. In S.L. Goldberg (Chair), *U.S. Army Transformation: Psychology's challenge to support future Soldiers*. Symposium conducted at the American Psychological Association's 2003 Annual Convention, Toronto, Canada.

- Bell, D.B., Schumm, W.R., & Frost, E. (2003, February). *On the Army's family support system for deployments: How the system came to be and how well it functions*. Paper presented at the 13<sup>th</sup> Annual Kravis-de Roulet Conference on Leadership in Work-Family Balance, Claremont, CA.
- Bell, D.B., & Frost, E. (2003, March). *Army children during dangerous deployments: What we know and what needs are still unmet*. Paper presented at the National Consortium for Child and Adolescent Mental Health Services, Washington, DC.
- Brady, E.J. (2002, October). *The multi-skilled Soldier Concept: Considerations for Army implementation*. Paper presented at the annual meeting of the International Military Testing Association, Ottawa, Canada.
- Brady, E.J. (2002, October). *The Automated Survey Generator (AUTOGEN)*. Paper presented at the annual meeting of the International Military Testing Association, Ottawa, Canada.
- Christ, R.E. (2002, October). *Training OFW small unit leader and team skills*. Paper presented at the 46<sup>th</sup> Annual Meeting of the Human Factors and Ergonomics Society, Baltimore, MD.
- Christ, R.E. (2002, October). *Training challenges in automating human cognitive processes: Implications for the light infantry warrior*. (Abstract of a panel session). Proceedings of the 46<sup>th</sup> Annual Meeting of the Human Factors and Ergonomics Society, Baltimore, MD.
- Cohen, M. S. et al. (2003). *Dialogue as Medium (and Message) for Training Critical Thinking: An Initial Test*. Presented at 6th International Conference on Naturalistic Decision Making.
- Cohen, M. S. (2002, October). Training Critical Thinking to Enhance Battlefield Initiative. In anonymous (Ed.), *Proceedings of the Human Factors and Ergonomics Society's 46th Annual Meeting Human Factors & Ergonomics Society*. 46th Annual Meeting Human Factors & Ergonomics Society, Baltimore, MD.
- Curnow, C., Belanich, J., Freeman, M. (2002, October) *Verifying learners and test takers in distance learning (DL) environments*. Paper presented at the annual meeting of the International Military Testing Association, Ottawa, Canada.
- Domeshek, E.A., Holman, E., & Ross, K. G. (2002, December). *Automated Socratic Tutors for High-Level Command Skills*. Paper presented at the Interservice/Industry Training, Simulation and Education Conference (I/ITSEC), Orlando, FL
- Dressel, J.D., Schaab, B. B., Sabol, M.A., Rittman, A., Jones, F., & Ferro, G. (2003, May). *Communications for success in net-collaborative environments*. Paper presented at the 15<sup>th</sup> Annual Convention of the American Psychological Society in Atlanta, GA.

- Dumanoir, P., Garrity, P., Lowe, V., & Witmer, B. G. (2002, December). *Embedded training for dismounted Soldiers (ETDS)*. Paper presented at the Interservice/Industry Training, Simulation and Education Conference (I/ITSEC), Orlando, FL.
- Fowlkes, J., Durlach, P.J., Drexler, J., Daly, J., Alberdeston, R. & Metevier, C. (2002, December). *Optimizing haptics perceptions for advanced army training systems: Impacts on performance*. Paper presented at the 23rd Army Science Conference, Orlando, FL.
- Graham, S.E. (2003, August) *objective force warrior training issues*. Paper presented at The Objective Force Warrior Fightability Workshop, Natick, MA
- Grubb, G., Crossland, N., and Katz, L.C. (2002, December). *Evaluating and delivering the U.S. Army Aircrew Coordination Training Enhancement (ACTE) program*. Paper Presented at the Interservice/Industry Training, Simulation and Education Conference (I/ITSEC), Orlando, FL .
- Halpin, S., McCann, C. and Pigeau, R. (2002, October). *Cross-national examination of the aspects of command*. Paper presented at the annual meeting of the International Military Testing Association, Ottawa, Canada.
- Heffner, T.S., & Knapp, D.J. (2002, October). NCO leadership tool: Research approach and measures. In T. S. Heffner & D. J. Knapp (Chairs), *U.S. Army non-commissioned officer of the future: Building a leadership assessment tool*. Symposium conducted at the annual meeting of the International Military Testing Association, Ottawa, Canada.
- Heffner, T.S., & Knapp, D.J. (2002, October). Situational judgment test research context. In G.W. Waugh (Chair), *Tailoring a situational judgment test to different pay grades*. Symposium conducted at the annual meeting of the International Military Testing Association, Ottawa, Canada
- Heffner, T.S., & Porr, W. P. (2003, April). *The incremental validity of situational judgment tests for performance prediction*. Paper presented at the 18<sup>th</sup> Annual Conference of the Society for Industrial and Organizational Psychology, Orlando, FL.
- Hill, R.W. Jr., Douglas, J., Gordon, A., Pighin, F.P., van Velsen, M. (2003, August) *Guided conversations about leadership: Mentoring with movies and interactive characters*. Proceedings of the Fifteenth Innovative Applications of Artificial Intelligence Conference (IAAI-03), Acapulco, Mexico.
- Holmquist, J., & Barnett J. S. (2002, October) *Combat medicine: A model for civilian mass casualty management?* Proceedings of the 46<sup>th</sup> Annual meeting of the Human Factors and Ergonomics, Baltimore, MD.

- Johnson, D., Couch, M., & Antoskow, R. (2003, January). *Optimizing the effectiveness of helicopter gunnery training* (288). Paper presented at the Aviation Gunnery Conference, Fort Rucker, AL.
- Katz, L.C. (2002, November). *Army ACTE program update*. Paper presented at the National Guard Bureau Safety and Standardization Conference, Salt Lake City, ID.
- Katz, L.C. (2002, December). *Evaluating and delivering the Army aircrew coordination training enhancement program*. Paper presented at the Interservice/Industry Training, Simulation and Education (I/ITSEC) Conference, Orlando, FL.
- Katz, L.C. (2003, April). *Army CRM training: Demonstration of a prototype computer based program*. Paper presented at the 12th International Symposium on Aviation Psychology, Dayton, OH .
- Katz, L.C. (2003 April). *ACTE program update*. Paper presented at the 385th Attack Helicopter Regiment Safety & Standardization Meeting, Phoenix, AZ.
- Katz, L.C. (2003, May). *Army CRM training: A computer-based enhancement*. Paper presented at the 49th Human Factors Engineering Group Technical Advisory Group Meeting, Augusta, GA.
- Kilcullen, R. (2002, October). Using U.S. Army Special Forces biodata measures to predict 21<sup>st</sup> century non-commissioned officer job performance. In T.S. Heffner (Chair), *U.S. Army non-commissioned officer of the future: Building a leadership assessment tool*. Symposium conducted at the annual meeting of the International Military Testing Association, Ottawa, Canada.
- Kilcullen, R. (2002, December). *Identifying agile and versatile officers to serve in the objective Force*. Paper presented at the 23rd Annual Army Science Conference, Orlando, FL.
- Kilcullen, R. N., Wisecarver, M. M., & Sanders, M. G. (2003, April). *Providing feedback on test of adaptable personality*. Paper presented as part of the Practitioner Forum, *Mission Critical: Developing Adaptive Performance in U.S. Army Special Forces* at the 18<sup>th</sup> Annual Conference of the Society for Industrial and Organizational Psychology, Orlando, FL.
- Knerr, B. W., Lampton, D. R , Martin, G.A., & Washburn, D.A., & Cope, D. (2002, December). *Developing an after action review system for virtual dismounted infantry simulations*. Paper presented at the Interservice/Industry Training, Simulation and Education (I/ITSEC) Conference, Orlando, FL.
- Lampton, D.R., Knerr, B.W., Martin, G.A., & Washburn, D.A. (2003, July). *Trends in ten years of immersive virtual environment research*. Paper presented at the IMAGE Conference, Scottsdale, Arizona.

- Lickteig, C.W., Sanders, W.R., Lussier, J.W., & Sauer, G. (2002, December). *FCS human systems integration: A focus on battle command*. Paper presented at the Interservice/Industry Training, Simulation and Education (I/ITSEC) Conference, Orlando, FL.
- Lochbaum, K., Psotka, J., & Streeter, L. (2002, December). *Harnessing the power of peers*. Proceedings of *Interservice/Industry, Simulation and Education Conference (I/ITSEC)*, Orlando, FL.
- Martin, D., & Legree, P. J. (2003, June) *Stereotype Threat, Cognitive Aptitude Measures and Social Identity*. Paper presented at the annual meeting of the International Public Management Association Assessment Council (IPMAAC), Baltimore, MD.
- Martin, D., Yeung, I., Legree, P. J. & Sloan, L. (2003, June). *Self-Motivating, Unobtrusive Cognitive Aptitude Measures: New Survey Technology*. Paper presented at the Second International Conference on Social Sciences, Honolulu, HI.
- Martin, D., Yeung, I., Legree, P. J. & Sloan, L. (2003, June). *Stereotype Threat, Cognitive Aptitude Measures and Social Identity*. Paper presented at the Second International Conference on Social Sciences, Honolulu, HI.
- Matthews, M.D., & Beal, S.A. (2002, October). *A field test of two methods for assessing infantry situation awareness*. Paper presented at the 46<sup>th</sup> Annual Human Factors and Ergonomics Society Meeting, Baltimore, MD.
- Meliza, L.L. (2003, March). *Digital proficiency feedback for collective exercises*. Paper presented at the Simulation Interoperability Workshop in Orlando, FL.
- Meliza, L. (2003, August). Defining digital skills. In S.L. Goldberg (Chair), *U.S. Army transformation: Psychology's challenge to support future Soldiers*. Symposium conducted at the American Psychological Association's 2003 Annual Convention, Toronto, Canada.
- Nourizadeh, S. M. & Steinberg, A. G. (2003, November). *Using Survey and Interview Data: An Example*. Paper presented at the 2003 International Military Testing Association, Pensacola, FL.
- Pleban, R.J. (2003, June). *Using virtual environments for conducting small unit mission rehearsals*. Paper presented at the 47<sup>th</sup> Annual Meeting of the Human Factors Ergonomics Society, Santa Monica, CA.
- Psotka, J., Streeter, L. A., & Lochbaum, K. E., (2003, March) *Giving distance learning a knowledge management edge*. Proceedings of the DLCC Conference, Army War College, Carlisle, PA.

- Psotka, J., Lochbaum, K. E., & Streeter, L. A. (2002, December) Automated Collaborative Learning. Paper presented at the 23<sup>rd</sup> Annual Army Science Conference, Orlando, FL.
- Putka, D.J., Waugh, G.W., & Knapp, D.J. (2002, October). Pay grade differences in the functioning of the situational judgment test. In G.W. Waugh (Chair), *Tailoring a situational judgment test to different pay grades*. Symposium conducted at the annual meeting of the International Military Testing Association Conference, Ottawa, Canada.
- Riedel, S., and Karrasch, A. (2002, October). *Training communication competence for multinational teams*. Paper presented at the annual meeting of the International Military Testing Association Conference, Ottawa, Canada.
- Ryder, J.M., Graesser, A.C., McNamara, J. Karnavat, A., & Popp, E. (2002, December). *A dialog-based intelligent tutoring system for practicing command reasoning skills*. Paper presented at the Interservice/ Industry Training, Simulation and Education (I/ITSEC) Conference, Orlando, FL.
- Sager, C.E., Putka, D.J., & Knapp, D.J. (2002, October). Measuring and predicting current and future NCO performance. In T.S. Heffner & D.J. Knapp (Chairs), *U.S. Army non-commissioned officer of the future: Building a leadership assessment tool*. Symposium conducted at the annual meeting of the International Military Testing Association Conference, Ottawa, Canada.
- Sanders, W. (2002, October). *Human command and control functional requirements for future systems*. Paper presented at the annual meeting of the International Military Testing Association Conference, Ottawa, Canada.
- Sanders, W. R., & Lickteig, C.W. (2002, December). *Human command and control functional requirements for future systems*. Paper presented at the 2002 Interservice/Industry Training, Simulation and Education (I/ITSEC) Conference, Orlando, FL.
- Schaab, B.B., Dressel, J.D., Sabol, M.A., Rittman, A., Jones, F. & Ferro, G. (2003, May). *Training Implications for Shared Situational Awareness in Net-collaborative Environments*. Paper presented at the 15<sup>th</sup> Annual Convention of the American Psychological Society in Atlanta, GA.
- Shadrick, S.B., & Lussier, J.W. (2002, December). *The application of think like a commander in the armor captains career course*. Paper presented at the Interservice/ Industry Training, Simulation and Education (I/ITSEC) Conference, Orlando, FL.
- Shadrick, S. & Lussier, J.W. (2003, April). *Training adaptive thinking*. Paper presented at the 18<sup>th</sup> Annual Conference of the Society for Industrial and Organizational Psychology Orlando, FL.

Siebold, G.L. (2003, March). *Genghis Kahn vs Maciver: Military training for 2004 and beyond.* Paper presented at the 66<sup>th</sup> Annual Meeting of the Southern Sociological Society, New Orleans, LA.

Steinberg, A. G. (2002, October). *Focus group interviews: An integral part of survey research.* Paper presented at the annual meeting of the International Military Testing Association, Ottawa, Canada.

Steinberg, A. G. & Nourizadeh, S. M. (2003, November). *Using Results From Attitude and Opinion Surveys.* Paper presented at the 2003 International Military Testing Association, Pensacola, FL.

Streeter, L., Psotka, J., Laham, D., & MacCuish, D. (2002, December). The credible grading machine: automated essay scoring in the DoD. Proceedings of *Interservice/Industry, Simulation and Education Conference (I/ITSEC)*, Orlando, FL.

Throne, M. H. (2003, August). Enabling Superior Performance for Future Soldiers of the Objective Force. In S.L. Goldberg (Chair), *U.S. Army transformation: Psychology's challenge to support future Soldiers.* Symposium conducted at the American Psychological Association's 2003 Annual Convention, Toronto, Canada.

Waugh, G.W., Putka, D.J., & Sager, C.E. (2002, October). Development and validation of a U.S. Army situational judgment test. In G.W. Waugh (Chair), *Tailoring a situational judgment test to different pay grades.* Symposium conducted at the annual meeting of the Society for Industrial and Organizational Psychology, Toronto, Ontario, Canada

White, L.A. (2002, October). A quasi-ipsative measure of temperament for assessing future leaders. In T. S. Heffner & D. J. Knapp (Chairs), *U.S. Army non-commissioned officer of the future: building a leadership assessment tool.* Symposium conducted at the annual meeting of the International Military Testing Association, Ottawa, Ontario, Canada.

Wightman, D. (2003, August). In S.L. Goldberg (Chair), *U.S. Army transformation: psychology's challenge to support future Soldiers.* Symposium conducted at the American Psychological Association's 2003 Annual Convention, Toronto, Canada.

Wisecarver, M. M., Kilcullen, R. N., & Sanders, M. G. (2003, April). *The warrior diplomats.* Paper presented as part of the Practitioner Forum, *Mission critical: Developing adaptive performance in U.S. Army Special Forces* at the 18<sup>th</sup> Annual Conference of the Society for Industrial and Organizational Psychology, Orlando, FL

Young, M.C. (2003, June). Effects of retesting on a new Army measure of motivational attributes: Implications for response distortion, test validity, and operational use. In S. M. Reilly (Chair), *Entry-Level Testing in the Public Sector: Identifying and Managing the Unexpected Applicant*. Symposium conducted at the annual meeting of the International Public Management Association Assessment Council (IPMAAC), Baltimore, MD.

### FY 2003 Poster Presentations

Belanich, J., Wisher, R. A., & Orvis, K. L (2002, December). *Text communication during online tactical operations center training*. A poster presented at the U. S. Army Science Conference, Orlando, FL.

Jerome, C. J. & Witmer, B. G. (2002, October). *Immersive tendency, feeling of presence, and simulator sickness: Formulating of a causal model*. Poster presentation at the 46<sup>th</sup> Annual Meeting of the Human Factors and Ergonomics Society, Baltimore, MD.

Kirkley, S. E., Kirkley, J. R., Borland, S.C., Waite, T., Dumanoir, P., Garrity, P. & Witmer, B. G. (2002, December). *Embedded training with augmented reality*. Poster session presented at the 23<sup>rd</sup> Army Science Conference, Orlando, FL.

Robinson, K.S., & Psotka, J. (2002, October). *Military tacit knowledge elicitation in written versus online settings*. Poster session presented at the 46<sup>th</sup> Annual Meeting of the Human Factors and Ergonomics Society, Baltimore, MD.

Rumsey, M. G., & Heffner, T. (2002, December). *Finding the right noncommissioned officers for the Objective Force*. Poster presented at the Army Science Conference, Orlando, FL.

Singer, M., & Kring, J. P. (2002, December). *Here and there: Distributed training in immersive simulations*. Poster presented at the 23<sup>rd</sup> Army Science Conference, Orlando, FL.

Zbylut, M., & Jones, A.P. (2003, April). *The equity, equality, and need principles of distributive justice*. Poster session presented at the 18th Annual Conference of the Society for Industrial and Organizational Psychology, Orlando, FL.

### FY 2003 Books or Book Chapters

Day, D. V., Zaccaro, S.J., & Halpin, S.M. (2004). *Leader Development For Transforming Organizations. Growing Leaders for Tomorrow*. Mahwah, New Jersey: Lawrence Erlbaum Associates.